

# Claims

[c1] What is claimed is:

1.A method for video decoding in a video decoding/de-interlacing display apparatus, utilizing a storage device having four frame buffers, the method comprising:

(a)decoding video data of a next picture;

(b)if the decoded next picture is a B picture, buffering the decoded video data of the next picture into a frame buffer of the storage device not stored with a reference picture nor a present display picture nor a previous display picture; and

(c)if step (b) is not applicable, buffering the decoded video data of the next picture into a frame buffer of the storage device stored with the previous display picture.

[c2] 2.The method of claim 1 further comprising:

(d)if the decoded next picture is a reference picture, buffering the decoded video data of the next picture into a frame buffer of the storage device not stored with the last decoded reference picture nor the present display picture.

[c3] 3.The method of claim 2 wherein the reference picture is an I picture.

- [c4] 4.The method of claim 2 wherein the reference picture is a P picture.
- [c5] 5.A method for video decoding in a video decoding/de-interlacing display apparatus, utilizing a storage device having four frame buffers, the method comprising:  
(a)decoding video data of a next picture; and  
(b)if the decoded next picture is a reference picture, buffering the decoded video data of the next picture into a frame buffer of the storage device not stored with the last decoded reference picture nor a present display picture.
- [c6] 6.The method of claim 5 wherein the reference picture is an I picture.
- [c7] 7.The method of claim 5 wherein the reference picture is a P picture.
- [c8] 8.The method of claim 5 further comprising:  
(c)if the decoded next picture is a B picture, buffering the decoded video data of the next picture into a frame buffer of the storage device not stored with a reference picture nor the present display picture nor the previous display picture.
- [c9] 9.The method of claim 8 further comprising:

(d)if step (c) is not applicable, buffering the decoded video data of the next picture into a frame buffer of the storage device stored with the previous display picture.

[c10] 10.An apparatus for video decoding and de-interlacing, comprising:

a video decoder for decoding video data to generate de-coded video data of a next picture;

a storage device coupled to the video decoder, the storage device having four frame buffers for buffering the decoded video data of the next picture into one of the four frame buffers according to data stored in the frame buffers;

a interlace/progressive converter coupled to the storage device, for de-interlacing data stored in the frame buffers to generate corresponding progressive video data; and

a controller coupled to the video decoder and the interlace/progressive converter, for controlling data access of the video decoder and the interlace/progressive converter to the frame buffers of the storage device.

[c11] 11.The apparatus of claim 10 wherein the controller controls the data access of the video decoder according to following principles:

(a)if the decoded next picture is a B picture, buffering the decoded video data of the next picture into a frame

buffer of the storage device not stored with the latest two reference pictures nor a present display picture nor a previous display picture; and

(b) if step (a) is not applicable, buffering the decoded video data of the next picture into a frame buffer of the storage device stored with the previous display picture.

[c12] 12. The apparatus of claim 10 wherein the controller controls the data access of the video decoder according to following principles:

if the decoded next picture is a reference picture, buffering the decoded video data of the next picture into a frame buffer of the storage device not stored with the last decoded reference picture nor a present display picture.

[c13] 13. The apparatus of claim 10 wherein the interlace/progressive converter is capable of performing motion adaptive de-interlacing operations.

[c14] 14. The apparatus of claim 13 wherein the interlace/progressive converter performs the motion adaptive de-interlacing operations incorporating video data of 3–8 fields stored in the frame buffers of the storage device.

[c15] 15. The apparatus of claim 10 being capable of performing recovery operations to video data from a telecine

source.